

FROGLOG

IUCN/SSC Declining Amphibian Populations Task Force

June, 1993, No. 6



NFWF and
NYZS Grants

The NATIONAL FISH AND WILDLIFE FOUNDATION (NFWF) is a nonprofit organization dedicated to the conservation of natural resources. Among its goals are species habitat protection, environmental education, public policy development, natural resource management, habitat and ecosystem restoration, and leadership training for conservation professionals.

The NFWF works by:

- * Forging innovative partnerships between the public and private sector.
- * Supporting projects that examine and provide solutions for root causes of environmental problems.
- * Awarding grants for conservation.
- * Averaging better than a 2:1 match: for every \$1 in federal matching funds, NFWF provides more than \$2 in direct non-federal contributions.
- * A firm commitment to no more than 5% overhead in annual operations.
- * Working in a national and international scope. Project locations include the USA, Puerto Rico, Canada, Mexico, Belize, Honduras, Costa Rica, Dominican Republic, Guatemala, Panama, Haiti, the Bahamas, Greenland, United Kingdom, Kenya, Tanzania and Russia.

The NFWF has six priority program areas. Among these are three relevant to the DAPTF mission.

Wetland conservation programs which are a cooperative undertaking between the United States, Canada and Mexico to protect and restore wetland habitat both in public and private ownership:

192 projects totaling \$41.4 million have been undertaken. Contact person: Mr. Lewis Nash.

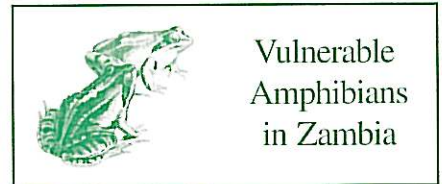
Conservation education programs for the public and leadership training for natural resource professionals, corporate leaders, key policy and political decision makers in fish and wildlife stewardship and management policies. More than \$10 million have been conferred to 154 projects. Contact person: Ms. Ivelise Velazquez.

Wildlife and habitat initiative which encompasses important conservation efforts not covered under the NFWF's other programs: 164 projects totaling \$13.2 million have been funded in this category including biodiversity preservation, threatened and endangered species recovery and big game management. Contact person: Mr. Jonathan Davis or Mr. Lewis Nash.

Those who desire further information on USA NFWF grant application procedures should contact the appropriate person at: 1120 Connecticut Ave. NW, Suite 900, Washington, DC, 20036, USA. Phone: (202) 857-0166, FAX: (202) 857-0162.

NYZS THE WILDLIFE CONSERVATION SOCIETY offers grants for conservation-oriented field research. Any individual is eligible to apply, but most awards go to professional biologists, Ph.D. candidates, and only in rare cases to master's candidates. Awards average under \$20,000 and the median grant is \$5,000. Funding is not provided for conferences, travel to scientific meetings, tuitions, or salaries at institutions, expensive laboratory analyses, or overhead costs. Because emphasis is on work in developing countries, funding is **not available** for research in the United States of America, Canada, Australia, or in Europe. The Conservation Committee meets three times a year. Deadlines for receipt of proposals are 1 January, 1 July, and 1 September. Proposals must be accompanied with a standardized cover sheet.

For more information on the program please write to: John Payne, Research Fellowship Program, NYZS The Wildlife Conservation Society, Bronx, NY 10460, USA.



Vulnerable
Amphibians
in Zambia

The 77 species, 20 genera and 7 families of amphibians present in Zambia comprise 6% of the total vertebrate species in that country. Though few studies have been done on the majority of species, the DAPTF National Coordinator for Zambia, Malumo P. Simbotwe, reports on vulnerable populations.

Montane and evergreen forest species suffer from clearcutting and other habitat alterations. Forest dwellers such as *Strongylopus fuelleborni* and Squeaking Frogs, genus *Arthrolepis*, are affected by removal of the canopy and forest litter.

Wetland areas are required habitat for the Clawed Frogs, *Xenopus laevis poweri* and *X. muelleri*. Wet grassland species of the genus *Ptychadena* and Puddle Frogs, *Phrynobatrachus*, are subjected to loss of riparian forests and drought conditions. Reed Frogs, including *Afraxalus wittei* and *Hyperolius* sp. as well as *Chiromantis xerampelina* are in areas where the vegetation is being removed.

Dryland and rock-dwelling genera include *Breviceps*, *Pyxicephalus*, *Hildebrandtia*. Burrowing frogs of the genera *Leptopelis*, *Bufo* and *Schismaderma* respond to wet and dry cycles by digging deeper during drought conditions.

Five critical habitats are identified for Zambian amphibians: 1) Islands in Kariba and Itezhi-Tezhi Lakes and the Bangweulu Basin wetlands are subject to pollution, fishing and dense human occupation. 2) The montane forests of Nyika Plateau, Mafinga and Makutu Mountains and the Makwi watershed are being decimated by logging, hunting, gathering, and fires. 3) The wetlands of Kafue, Zambezi, Luapula river drainages; Lakes Mariba and Itezhi-Tezhi are affected by chemical and solid waste pollution, water extraction for mining and agricultural development. 4) The deserts of the Kalahari ecosystem, and southern region of the Western Province are suffering habitat destruction. 5) Rainforests in Central, Northern and Copperbelt Provinces are being clearcut.

Dr. Simbotwe is with the National Centre for Environmental Education in Livingstone, Zambia.



Mass Mortality in Switzerland

During the winter of 1990/91 a mass mortality of the Common Frog, *Rana temporaria*, was observed in the northern parts of Switzerland to a greater extent than ever before.

This study investigates the causes of the event by means of inquiries and comparing this information with water chemistry, pathological and meteorological analyses. The results suggest that the frog mortality was mainly due to an oxygen deficit. During freezing temperatures when the ice sheet is closed, the oxygen concentration within the lower water table decreases rapidly towards zero in eutrophic ponds with dense vegetation growth and without water inlets. The macroinvertebrates were also affected by the poor quality of the water. Ponds in which frog mortality occurred had only a few numbers of species. These results show that artificial ponds are not suitable hibernation places for most species. They are by no means a substitute for natural oligotrophic ponds.

English abstract from: Gerlach, G. and A. Bally. 1992. Mass mortality of the common frog (*Rana temporaria*) in northern Switzerland. *Natur und Landschaft. Schriftenreihe Umwelt Nr. 192.*



United Kingdom National Survey

This final report documents the findings of the 1989-92 National Amphibian Survey, Herptile Sites Project (funded by English Nature) with respect to the status of five widespread species native to the United Kingdom: the Common Frog (*Rana temporaria*), Common Toad (*Bufo bufo*), Smooth Newt (*Triturus vulgaris*), Palmate Newt (*Triturus helveticus*) and Crested Newt (*Triturus cristatus*). Data obtained from two previous contracts with English Nature are included, which thus represent a continuous series of studies beginning in 1983. During the project a computerized mailing list of over 1,000 contacts was compiled. The amphibian site database contained 11,059 water-body (pond) records, of which 49% included detailed site descriptions. Distribution of sites was plotted on a 10 X 10 km grid.

A wide range of water-body types was surveyed: over 50% were considered to have a use and 35% were perceived to be threatened by harmful activities. Threats and uses associated with each water-body category were identified. Systematic surveys revealed a median for mainland Britain of 1.4

ponds km². Eleven percent of sites were reported to be at a stage of advanced succession and 17% were reported to desiccate regularly.

The distributions and status of the five species at national, county and local levels are reported. *Rana temporaria* occurred in a high proportion of 10 km squares nationally and in most counties, but were present in less than half (47%) of systematically-surveyed ponds. *Bufo bufo* were almost as widespread nationally; they occurred in fewer localities within counties and were found in 23% of ponds. Apart from a few small areas of overlap, the ranges of the Smooth Newt and Palmate Newt were almost mutually exclusive. Smooth and Palmate Newts were ubiquitous in fewer than half of the counties in which they occurred and, where present, they were found in 27% and 17% of water-bodies, respectively. The Crested Newt exhibited a lowland and eastern distribution, was found to be ubiquitous in approximately one third of the counties within its range, and was recorded in only two percent of ponds surveyed systematically.

Terrestrial habitat diversity appeared to be important for all five species. Crested Newts occupied a narrower range of types of pond and terrestrial landscape than the other four. Landscapes that were predominantly arable were particularly inimical to the Common Frog and Crested Newt. The relative importance of terrestrial habitat features as correlates of species presence was greater in landscapes with low diversity (such as arable or improved grassland) than in landscapes dominated by woodland or rough grassland.

The important habitat features were, however, identified from time-specific data, and give no indication of whether the recorded landscape features were associated with stable, increasing or decreasing populations. Changes in local and national status with respect to landscape development can only be assessed by longer-term studies.

On the basis of current information and criteria, 95% of recorded Crested Newt sites do not qualify for special protection. Therefore a conservation strategy based entirely on the notification of the best amphibian sites as Sites of Special Scientific Interest (SSSI) may not be appropriate for the Crested Newt, or indeed for any of the other widespread species.

A national strategy for the conservation of widespread species would logically make provision not only for the maintenance of high status where it exists already, but also for the improvement of species status in currently impoverished parts of the country. Despite wide species distributions, the status of each of the five species in the greater countryside is generally low, especially that of the Crested Newt.

A list of 184 candidate sites for (SSSI) designation was compiled on the basis of Crested Newt counts and species assemblage. The sites with the best species assemblages within each country agency region were also listed. Herpetofauna Recorders' Meetings were held in 1990, 1991 and 1992 to instruct

in survey methodology and collate results. Country agencies were supported throughout the contract, and data were transferred to the Biological Centre at Monks Wood.

Recommendations for achieving enhanced status for the Crested Newt and for the other four species may be applied at local and national levels. Local enhancement is achievable by managing sites to obtain water-body characteristics, pond densities and terrestrial habitat composition. National enhancement may be achieved by combining the specific habitat information with national distribution and status data as follows: 1) conserving remaining natural and semi-natural vegetation; 2) increasing the diversity of agricultural lowlands by the restoration and maintenance of features such as ponds and woodlands; 3) conserving, restoring, and in some areas, increasing the small water-body resource throughout Britain; and 4) maintaining and developing the volunteer recorder network. Emphasis should be placed on systematic surveying and long-term monitoring of both amphibians and their habitats.

These studies were conducted under the supervision of Drs. M.J.S. Swan and R.S. Oldham of the UK Joint Nature Conservation Committee. Copies of the report (English Nature Research Reports, No. 38, Herptile Sites, Vol. 1: National Amphibian Survey, Final Report with Appendices, 1993) are available from the Publicity and Marketing Branch, English Nature, Northminster House, Peterborough PE1 1UA, UK.



Red Leg in the Rockies

In the June, 1993, issue of Conservation Biology [7(2):355-362] Cynthia Carey presents a "Hypothesis Concerning the Causes of the Disappearance of Boreal Toads from the Mountains of Colorado."

Between the years 1974 to 1982 eleven populations of *Bufo boreas boreas* completely vanished in the West Elk Mountains of Colorado, USA. Dr. Carey suggests a paradigm of disease, in combination with other factors, as an explanation for extinction of these populations and perhaps declines in other amphibian species as follows:

- (1) Certain factors in the environment, perhaps acting synergistically, alter to cause sublethal stress on the population.
- (2) Such stress results in direct inhibition of the immune system or indirectly by increasing the production of adrenal cortical hormones.
- (3) This immunosuppression, in combination with the possible effect of cold body temperatures in reducing the resistance to disease, enables infection by *Aeromonas hydrophila* ("Red leg") bacteria as well as other pathogens with lethal results.

Dr. Carey also presents a protocol for testing her hypothesis, which initiates by recognizing the need for defining the character of "stressed" or "healthy" animals in both field and laboratory conditions. Further evidence must be obtained regarding factors that affect an increase in adrenal cortical hormones and of reduced temperature levels upon antibody production. At present the coupling of immunosuppression and *Aeromonas* infection is also unclear.

The extent to which the model can be applied will also depend upon: determination of the proximate lethal factor impacting upon the population; explanation as to why some species in a given locality are suffering declines while others are unaffected; and the need for long-term studies to identify any departures from natural population fluctuations.



Declines Down Under

During the past thirteen years four frog species living along upland rainforest streams in southern and mid-eastern Queensland, Australia, have apparently disappeared. The Southern Day Frog, *Taudactylus diurnus*, was last seen in the Conondale Ranges in early 1979, and the Platypus Frog, *Rheobatrachus silus*, sympatric with *T. diurnus* over much of its range, disappeared at about the same time. The last record of *R. silus* in the field was an adult male found September, 1981. The subsequent documentation of declines in populations of *Rheobatrachus vitellinus* and *Taudactylus eungellensis* in mid-eastern Queensland raised fears that other stream dwelling species, particularly those in the rainforests of northern Queensland, may be at risk.

Ninety one percent (20 of 22) of the rainforest species occurring in the Wet Tropics Biogeographic Region are endemic. Eight of these occupy stream habitats similar to those inhabited by *Taudactylus* and *Rheobatrachus* in southern and mid-eastern Queensland. Several of these species are currently considered rare and threatened, and two have been listed as endangered. However there have been no previous attempts to quantify the status of these species.

For the past four years, Stephen J. Richards, Keith R. McDonald and Ross A. Alford have been applying repeatable, standardized quantitative techniques to examine amphibian populations in the upland rainforests in northern Queensland. Some of these data are included in their October, 1992, report on "The Status of Declining Frog Populations in the Wet Tropics Biogeographical Region" contracted by the Wet Tropics World Heritage Management Agency.

Populations of six frog species endemic to the tropical rainforests of northern Queensland have waned. Declines appear to be confined to populations of

stream dwelling species, and have occurred primarily at high altitudes in the southern portions of the Wet Tropics World Heritage Area (WTWHA). An extensive survey (December 1991-September 1992) failed to find any individuals of two upland species, *Litoria nyakalensis* and *Taudactylus rheophilus*. Another upland species, *T. acutirostris*, formerly widely distributed in rainforests north of the Herbert River, now appears to be confined predominantly to rainforests north of the Daintree River. Three other species, *Litoria nannotis*, *L. rheocola* and *Nyctimystes dayi* were absent from most upland sites south of the Daintree River, but were common at lowland sites, and at all sites north of the Daintree River. Declines have occurred in "core" areas such as the Carbine Tableland, suggesting that the species affected are not at their ecological limits. The Big Tableland uplands had the highest densities of *Taudactylus acutirostris*, *Litoria nannotis* and *Litoria rheocola*, and are identified as a region where research should be conducted.

Data on patterns of rainfall variability in the WTWHA show no trends that could explain population declines in this area. Similarly, water quality analyses failed to identify any agents that could be toxic to amphibians living along upland rainforest streams. We present a series of recommendations including 1) monitoring of potentially endangered populations be continued, 2) a study be conducted to investigate the role of diseases as a possible causal factor, 3) transplantation experiments be initiated, and 4) consideration be given to the establishment of a captive breeding program for some of these species. The Sharp Snouted Torrent Frog, *Taudactylus acutirostris*, should receive the highest priority if such a scheme is developed.

This summary was provided by the authors. For further details contact: S.J. Richards and R.A. Alford, Zoology Dept., James Cook Univ. of North Queensland, Townsville, QLD 4811; K.R. McDonald, Dept. of Environ. and Heritage, Pallarenda, QLD 4810, Australia.



The Ghats of India

The Western Ghats of India are very rich in amphibian species with 117 species of frogs, toads and caecilians. Eighty-nine are endemic to this biogeographical region. Analyses of ranges and geographical distribution patterns of amphibians on the Western Ghats suggest that the southern half of the Western Ghats and the low-medium elevation hills are more diverse in species than the northern half and higher hills. This is attributed to the more widespread rainfall and the less variable climatic conditions in the south. About half the species are apparently localized. Of those species with wider ranges, a majority show patchy distribution. Species pre-

ferring the moist evergreen forest as habitats tend to have patchy distributions. This appears to be a result of habitat destruction and fragmentation. The overall patterns of species richness and local endemism are rather different from those of the angiosperms and birds. In birds and angiosperms, a significant proportion of endemics are found on the higher hills. On the contrary, endemic amphibian species are found in the lower altitudinal range of 0-1000 m, with a majority between 800 and 1000 m.

Abstract from: R.J. Ranjit Daniels. 1992. Geographical distribution patterns of amphibians in the Western Ghats, India. *J. of Biogeography*. 19: 521-529.



Yellowstone Ecosystem

Studies of amphibian populations in the greater Yellowstone Ecosystem are important for several reasons, including: (1) the amphibian species which occur there are experiencing problems elsewhere in their ranges, especially Spotted Frogs and Western Toads; (2) the region is relatively undisturbed and thus may provide comparisons valuable for testing hypotheses concerning the causes of declines (e.g. water pollution); and (3) it is relatively protected and will be available for long term studies. To determine the status of amphibian populations in the Yellowstone and Grand Teton National Parks of Wyoming, USA, we sampled eight sites several times during the spring and summer of 1991. Park personnel collaborated in the sampling and significantly increased the amount of data we were able to obtain. We gathered information on the physical and biological conditions at each site (elevation, water chemistry, weather, presence of fish, etc.) All of the sampled localities had intermediate pH values (6.8-8.5) and sufficient buffering capacity so that they are not at risk of acidification from acid precipitation. Our principal technique for sampling amphibians consisted of timed searches in which we counted or estimated the number of egg masses, larvae, juveniles, and adults seen or heard.

Four species of amphibians were found. Western Toads (*Bufo boreas*) were located at only three of the eight sites and at only one of five sites from where they were previously recorded. This species appears to be less widespread and less abundant than in the past. Spotted Frogs (*Rana pretiosa*) were present, abundant, and reproducing at all eight sites. The widespread distribution (seven of eight sites) of Western Chorus Frogs (*Pseudacris triseriata*) was easy to determine because of their spring calling behavior. However, relatively few adults, eggs, or tadpoles were observed. Tiger Salamanders (*Ambystoma tigrinum*) were relatively difficult to sample and were found at only half of

the sites. We did not find salamanders at sites with fish. Attempts to compare our results with previous studies from the 1950's by Frederick Turner and Charles Carpenter were confounded by developments at their sites (e.g., road construction).

The above has been summarized from: Monitoring Amphibian Populations in Yellowstone and Grand Teton National Parks. Final Report to University of Wyoming - National Park Service Research Center, October, 1992. by Charles R. Peterson¹, Edward D. Koch² and Paul Stephen Corn³. ¹Dept. of Biol. Sci., Idaho State University; ²US Fish & Wildlife Serv., Boise, ID; ³US Fish & Wildlife Serv., NERC, Ft. Collins, CO, USA.



Recent Conferences

The First National Workshop for Analysis of Declines in Amphibian Populations (1^o Taller de Analisis de la Declinación de las Poblaciones de Anfíbios) convened in Mérida, Venezuela, March 14-16, 1993. Dr. Jaime Péfaur, a Director of the DAPTF and Regional Coordinator for South America, organized the program of reports, round table discussions and a concluding field trip. Relevant topics included presentations on: mass extinctions in earth's history, climatic change, hydrologic cycles, environmental deterioration, effects of pollution, distribution and declines among Venezuelan amphibians, politics and faunal protection. The purpose of the round-table sessions was to develop a national action plan for Venezuela. Among those attending were faculty members and researchers from the Universidad de los Andes, various professionals from non-governmental and governmental agencies, as well as administrators of national ministries.

For further information contact: Dr. Jaime E. Péfaur, Ecología Animal, Facultad de Ciencias, Universidad de Los Andes, Mérida 5101, Venezuela.

The Society for Northwestern Vertebrate Biology convened its annual meeting in Astoria, Oregon, USA, on March 18-20, 1993. The theme, "Amphibians in the Northwest;" was highlighted by two symposia, a workshop, and a contributed-paper session on northwestern US amphibians. The attendance of about 230 people from 11 of the United States and two Canadian provinces indicated that the declining amphibians issue has become an important topic. Deana Olson chaired an operational session of the US Regional Pacific Northwest Working Group during the meetings.

The first symposium, "Amphibian Monitoring in Western National Parks,"

was chaired by Paul Stephen Corn, Co-Chair of the Rocky Mountain DAPTF. Seventeen authors, including Charles C. Carpenter and Frederick B. Turner who pioneered studies of amphibians in the Yellowstone and Grand Teton regions, contributed to eight presentations. Some of the papers will be published as symposium proceedings in The Northwestern Naturalist.

The second symposium on "Declining Amphibian Populations," included seven papers by nine authors and was chaired by Lawrence L.C. Jones, an SNVB Vice-President. Robert M. Storm, herpetologist and Professor Emeritus at Oregon State University, chaired the concluding session of seven contributed papers, of which all were on the topic of northwestern amphibian populations.

The workshop entitled "Biology of Northwestern Amphibians" included a live amphibian display, sampling techniques, differentiation of *Ambystoma gracile* and *A. macrodactylum* larvae, radioisotope tagging, collecting, measuring, and preserving amphibians, as well as herpetological literature. A pre-publication sale was held for the new Seattle Audubon Society field guide "Amphibians of Washington and Oregon."

There were field trips to Long Island and Willapa Hills to observe live amphibians in their natural habitats in southwestern Washington, the most species-rich area of the state.

For abstracts of papers offered at the symposia and contributed papers session contact: Lawrence L.C. Jones, USDA Forest Service, Pacific NW Research Station, 3625 93rd Ave. SW, Olympia, WA 98512, USA or James L. Vial, Coordinator, DAPTF.



Southern Salamanders

James W. Petranka, Matthew E. Eldridge and Katherine E. Haley [in Conservation Biology, 7(2):363-370, June, 1993] report on the "Effects of Timber Harvesting on Southern Appalachian Salamanders." They compared species richness and abundance of 12 salamander species in six recent clearcut areas (less than 10 years) with that in 34 mature (more than 50 years) forest stands in western North Carolina, USA. Collections in mature forest habitat were approximately five times greater than those obtained in recent clearcuts. Almost all salamander species and "major taxonomic groups" were negatively affected by the logging activity. The average numbers of species found in mature forests stands was nearly twice that found in clearcuts.

These investigators conclude that 50-70 years are required for salamander populations to recover to predisturbance levels following timber removal. They also estimate an annual loss of 14 million salamanders as a result of clearcutting the U.S. National Forests in western North Carolina.



Herp-Net

The Herpetology On-line Computer Network, Herp-Net, invites all modem users to participate in its international communication system for those interested in the study, propagation, or conservation of reptiles and amphibians. Herp-Net was created to facilitate the exchange of information and ideas among zoos, herpetologists, veterinarians, biologists, conservationists, and the interested public. Herp-net is available 24 hours/day through any modem-equipped computer or terminal. The direct dial system has 10 incoming phone lines connected to (215)464-3564. Access is open to all without pre-registration or required fees.

A special section has been proposed for veterinarians to consult privately among themselves and will be integrated into Herp-Net if enough veterinarians express an interest in this feature. For more information contact: Mark F. Miller, System Administrator, Herp-Net, P.O. Box 52261, Philadelphia, PA 19115, USA. FAX messages are accepted on (215) 464-3561 anytime. (USA international code is 1.)



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